Spent Nuclear Fuel basket fabrication completed

Michele Gerber, *Fluor Hanford*

Fluor Hanford machinist George Shockley works at a lathe for the Basket Fabrication Project.

In mid-December, workers finished manufacturing all of the 2,209 copper and steel baskets needed to hold irradiated fuel assemblies for the Spent Nuclear Fuel Project. A joint project team made up of Fluor Hanford SNF Project personnel, quality control inspectors with the Environment, Safety, Health and Quality Assurance organization, and Hanford Site Operations planners, machinists, welders, sheet-metal workers, teamsters, and tool and material coordinators finished the baskets ahead of schedule and under budget.

Fluor Hanford HSO director John Wood called it a remarkable achievement. “I’m extremely proud of the way the team delivered a quality product under budget and ahead of schedule,” Wood said, “proving just how good they are. Besides that, they’re a great group of folks to be around. It’s been a tremendous project!”

As part of a vigorous quality-assurance basket verification effort, Fluor Hanford Quality Control inspector Mike Wingfield measures a basket that will be used to hold spent nuclear fuel.

The unique team, formed in 1998, met every one of 16 interim milestones early, and reduced the unit cost per basket continually throughout the life of the project. While the first production-size batch of baskets fabricated in 1999 cost $11,300 per unit, the cost of the final production lot came in at just $8,819 per basket — a decrease of approximately 22 percent. In fiscal year 2002, the basket project returned more than $3 million of its allocated budget for use in other cleanup work. At its peak, the project manufactured nearly six baskets per day.

The baskets, each weighing between 230 and 625 pounds, are about 2 feet tall and 22 inches in diameter. In total, they contain more than 1.1 million pounds of material and more than 3 miles of welding.

To manufacture the baskets, workers had to fabricate and assemble nearly 46,000 components, and they did so with less than a quarter of one percent (0.22 percent) of the parts being scrapped resulting from quality issues. Because the nuclear fuel they will hold is expected to go to a national repository, the baskets were inspected for adherence to the stringent quality-assurance standards of the Office of Civilian Radioactive Waste Management.

Workers praised

At a December celebration luncheon in the 328 Shop Building where the baskets were manufactured, Norm Boyter, Fluor Hanford vice president for the SNF Project, praised the fabrication endeavor. “Thank goodness you were here, and that you did such an excellent job,” Boyter said. “We at the SNF Project need your products, we’re using them, and you’ve always given us superb service. Thanks for a terrific job.”

Rich Slocum, HSO deputy and senior director, pointed to a key lesson that he said everyone should take away from the project. “It was essentially managed by the workers,” Slocum said, “and it shows that you can achieve excellence by listening to the people doing the work.”

Mike Butterworth, manager of Site Fabrication Services, called the baskets project a “signature success in reverse engineering” — in other words, letting the workers take the lead. “Stop for a minute and savor your success,”

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he told the workers. “It took every single person here to make this effort work. We decided early in the process that everyone who was going to touch the baskets process or have a vote in it in any way needed to be in the same location and to function as a team. We did that, and now we can see the impressive results. You could not possibly have done better, and I congratulate each of you.”

Rex Ozment, now-retired shop supervisor for most of the project, likened it to a canoe. “There’s no such thing as the management end of the canoe sinking or the worker end sinking. If one sinks, the other does also, so it’s essential to work together.”

On-site production

In 1997, when the SNF Project was determining its procurement strategy for the many unique pieces and types of equipment it would need, there was much discussion of how, where and by whom the baskets would be fabricated. Off-site fabrication was considered.

A 1998 pre-production test run of 30 baskets by Site Fabrication Services came in over budget and with quality shortcomings. However, Fluor Hanford held a series of value-engineering sessions with workers and eliminated 75 redundant or overlapping procedures. It also identified 62 cost-avoidance items and prescribed changes to the shop and equipment layout to streamline the work processes.

All participants in the baskets project were collocated in the 328 Shop Building, along with leased computer-numeric-controlled lathes and milling machines and some machinery from the 200 West Area shops. By the time the newly organized team delivered the first production run of 60 baskets in late 1999, the quality was excellent and costs had dropped substantially.

“In a nutshell, it was a team effort,” said HSO welder Dave Bushey in a November 2002 gathering to discuss the project. “The only thing I regret is that now we’re going to lose the team.”

“There was an open book at all times to improve the product,” said machinist Floyd Mohr. “If we had an idea, management listened.”

Denny DeVine, team lead for baskets and Multi-Canister Overpacks, said the main reason for the project’s success was that craft workers “took ownership” of the project schedule. “They were totally involved as I built the construction cost estimate and schedule,” he said. “Making milestone dates throughout the project’s 39-month life was just as important to them as it was to me.”

“Pull together a dedicated team, choose well and get them all involved early” was the formula for success, according to Rich Bilskis, MCO/Baskets project manager. “This will have a major impact on how business is done.”

Quality Control inspector Mike Wingfield summed up the baskets endeavor succinctly: “I have been an inspector for over 25 years on nine nuclear plants and two DOE sites, and have never seen a more well-organized and self-disciplined organization in my career. This wasn’t a result of management’s oversight — just the opposite. It was management letting the workers do their jobs and treating them with respect.”

Also participating in the basket-fabrication endeavor were personnel with Fluor Federal Services, Lockheed Martin Information Technology, former site contractor DynCorp Tri-Cities Services, and off-site vendors including Duke Engineering, ARES Corp. and Mid-Columbia Engineering. ■